



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,087	02/22/2002	Futoshi Tanigawa	10059-406US (P27064-01)	2369
570	7590	10/30/2006	EXAMINER	
AKIN GUMP STRAUSS HAUER & FELD L.L.P. ONE COMMERCE SQUARE 2005 MARKET STREET, SUITE 2200 PHILADELPHIA, PA 19103				
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 10/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.



UNITED STATES PATENT AND TRADEMARK OFFICE

---

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/081,087  
Filing Date: February 22, 2002  
Appellants: Tanigawa et al.

---

Sandra M. Katz  
For Appellant

**EXAMINER'S ANSWER**

**MAILED**  
OCT 30 2006  
**GROUP 1700**

This is in response to the appeal briefs filed August 10, 2006.

**(1) *Real party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

Examiner is not aware of any related proceedings.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellants' statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Claimed Subject Matter***

The summary of claimed subject matter contained in the brief is correct.

**(6) *Grounds of Rejection to be Reviewed on Appeal***

The appellant's statement of the grounds of rejection in the brief is correct.

**(7) *Claims Appendix***

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

<u>Number</u>	<u>Name</u>	<u>Date</u>
US 6,083,642	Kato et al.	July 4, 2000
US 6,358,648 B2	Hayashi et al.	March 19, 2002

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102/103***

1. Claims 1-4,6-8 are rejected under 35 U.S.C.102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hayashi et al. (US 6,358,648 B2).

With respect to claims 1,3,4,6,7, Hayashi et al. teach a nickel electrode active material comprising nickel hydroxide for alkaline storage batteries. Nickel hydroxide is produced by mixing and stirring an aqueous nickel sulfate solution and an aqueous sodium hydroxide solution thereby depositing nickel hydroxide. The powders are then subjected to alkali treatment with one of aqueous sodium hydroxide solutions having different pH values (alkali treatment) to remove anions such as sulfate. Spherical powders, i.e., mean particle circularity is equivalent to 1, of solid solute nickel hydroxide incorporating therein one or two elements selected from the group consisting of cobalt, cadmium, zinc and magnesium are produced. The mean particle size of the resulting powder is reported to be about 10  $\mu$ m. Hayashi et al. further teach that the

resulting nickel hydroxide particles have better crystal growth and more homogeneous crystal along certain crystal plane than conventional nickel hydroxide. As a result, the decreases in the number of disordered crystals suggest uniform progress of charge reaction of nickel hydroxide to nickel oxyhydroxide. Thus, the positive electrode active material would invariably comprise nickel oxyhydroxide upon charging the battery. See Abstract, Column 3, Lines 51-67; Column 4, Lines 39-51; Column 6, Lines 39-46. Moreover, it is the position of the examiner that other properties of said material, such as BET surface area, particle size distribution and full width at half maximum of a particular crystallographic orientation, are inherent, given that the positive electrode active material disclosed by Hayashi et al. and the present application having same chemistry and manufacturing procedures. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

Alternatively, Hayashi et al. teach the nickel hydroxide is produced by mixing and stirring an aqueous nickel sulfate solution and an aqueous sodium hydroxide solution at different pH values. See Example 1. It is well known in the art that mixing and stirring enhance the uniformity of the multiple components in the solution. Thus, Hayashi et al. would identify mixing (stirring) and pH values of the solution as processing variables in the fabrication of positive electrode active material. Therefore, it would have been within the skill of the ordinary artisan to adjust the degree of mixing and pH value of the solution to yield nickel hydroxide or nickel oxyhydroxide powders of desired circularity and distribution of circularity. Discovery of

optimum value of result effective variable in known process is ordinarily within skill of art. *In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215.

With respect to claim 2, Hayashi et al. teach the solid solution nickel hydroxide powders are produced by dissolving a sulfate of one or two elements, including cobalt, cadmium, zinc and magnesium, in the nickel sulfate solution. Therefore, the resulting positive electrode active material would have a cobalt compound on a portion of the surface. See Column 6, Lines 37-46.

With respect to claim 8, Hayashi et al. teach the positive electrode active material is first mixed with a cobalt powder, a cobalt hydroxide powder and a zinc oxide powder. Water is then added to the mixture and kneaded to make a paste, which is filled onto a foamed porous nickel substrate. See Column 5, Lines 11-20.

2. Claims 1-4,6-8 are rejected under 35 U.S.C.102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kato et al. (US 6,083,642).

With respect to claims, 1-4,6,7, Kato et al. disclose a positive electrode material for an alkaline storage battery. The active material comprises nickel hydroxide particles and a higher cobalt oxide ( $\gamma$ -cobalt oxyhydroxide). The positive electrode material is prepared by coating the surface of nickel hydroxide particles with the higher cobalt oxide. The nickel hydroxide particles are a solid solution material with one or more metallic element other than nickel, including cobalt, cadmium, and zinc. The solid solution nickel hydroxide particles with the cobalt oxide coating have an average particle diameter of 5 to 20  $\mu\text{m}$  and a BET specific surface area of 5 to 12  $\text{m}^2/\text{g}$ . In one embodiment, an aqueous solution containing nickel sulfate as the

main component and cobalt sulfate and zinc sulfate are mixed. An aqueous sodium hydroxide solution is slowly added dropwise while adjusting the pH of the solution with aqueous ammonia, thereby to deposit spherical solid solution nickel hydroxide particles, i.e., the circularity of the particles is 1. The solid solution nickel hydroxide particles with Co and Zn incorporated therein thus prepared are washed with water and then dried to obtained positive electrode particles. Also, Kato et al. reveal the presence of nickel oxyhydroxide in the positive electrode active material based on the X-ray diffraction and the spectral calorimeter studies. See Abstract, Column 4, Lines 22-42; 66 to Column 5, Line 5; Column 11, Lines 50-65; Column 6, Lines 39-46; Column 13, Lines 26-45; Column 29, Lines 1-12. Moreover, it is the position of the examiner that other properties of said material, such as full width at half maximum of a particular crystallographic orientation, are inherent, given that the positive electrode active material disclosed by Kato et al. and the present application having same chemistry and manufacturing procedures. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

Alternatively, Kato references have identified pH and temperature of the solution as critical processing variables in the fabrication of positive electrode active material. See Column 2, Lines 15-45. Therefore, it would have been within the skill of the ordinary artisan to adjust the pH of the solution to yield nickel hydroxide or nickel oxyhydroxide powders of desired circularity and distribution of circularity. Also, it is well known in the art that mixing and

stirring enhance the uniformity of the multiple components in the mixture. Thus, Kato et al. would identify mixing (stirring) of the solution as a processing variable in the fabrication of positive electrode active material. Therefore, it would have been within the skill of the ordinary artisan to adjust the degree of mixing of the solution to yield nickel hydroxide or nickel oxyhydroxide powders of desired circularity and distribution of circularity. Discovery of optimum value of result effective variable in known process is ordinarily within skill of art. *In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215.

With respect to claim 8, Kato et al. teach the positive electrode active material is first mixed with a cobalt powder, a cobalt hydroxide powder and a zinc oxide powder. Water is then added to the mixture and kneaded to make a paste, which is filled onto a foamed porous nickel substrate. See Column 11, Line 66 to Column 12, Line 10.

**(10) Response to Argument**

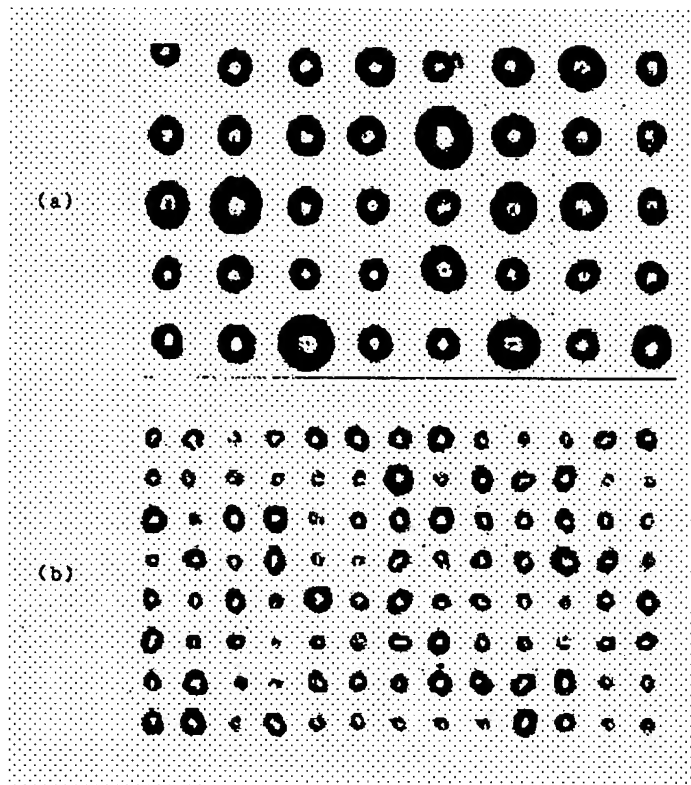
1. *The examiner has ignored the differences between the chemistry and manufacturing procedures of Hayashi and the present invention. The active material of Hayashi would not inherently exhibit the claimed properties.*

The images of the powder in the instant specification are duplicated below, wherein (a) particles having a size from 10 to 20  $\mu\text{m}$  and (b) particles having a size from 5 to 10  $\mu\text{m}$ . It is found that the mean particle circularity of these particles is 0.97 and the percentage of population with particle circularity less than 0.85 is 2.5%. Appellants argue that the pH value, temperature



Art Unit: 1745

and degree of agitation of the aqueous alkaline solution are critical in obtaining powders of desired characteristics.



The Hayashi reference teaches the nickel hydroxide powder is prepared by mixing and stirring an aqueous nickel sulfate solution and an aqueous sodium hydroxide solution thereby depositing nickel hydroxide. In order to stabilize any metal ion such as nickel ion, the aqueous nickel sulphate solution contains ammonia as a complex forming agent. Subsequently, various nickel hydroxide materials are subjected to alkali treatment to remove the sulphate ions. The resulting nickel hydroxide powder is sphere (i.e., circularity is equal to 1) having a mean particle size of about 10  $\mu\text{m}$ . See Column 4, Lines 33-51. Hayashi is silent about the X-ray diffraction and the specific surface area of the resultant powders. However, it is the position of the

examiner that properties of said material, such as BET surface area and full width at half maximum of a particular crystallographic orientation, are inherent, given that the positive electrode active material disclosed by Hayashi et al. and the present application having same chemistry and synthesis procedures.

Alternatively, Hayashi reference discloses the purity of the nickel hydroxide powder can be improved by adjusting pH value of the alkaline solution and duration and times of the alkali treatment. See Column 3, Lines 39-42. It is clear that Hayashi et al. adjust the pH value of the aqueous alkaline solution by adding sodium hydroxide into the mixture. The agitation of the solution would have to be persistent to maintain the chemical homogeneity of the resulting powders. Addition of sodium hydroxide solutions having different pH values further controls the content of the  $\text{SO}_4^{2-}$  ions in the nickel hydroxide. See Column 4, Lines 39-43. Thus, Hayashi et al. would identify mixing (stirring) and pH value of the solution as processing variables in the fabrication of positive electrode active material. Therefore, it would have been within the skill of the ordinary artisan to adjust the degree of mixing and pH value of the solution to yield nickel hydroxide or nickel oxyhydroxide powders of desired circularity and distribution of circularity. Discovery of optimum value of result effective variable in known process is ordinarily within skill of art. *In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215.

2. *The uniqueness of the claimed particle circularity and circularity distribution of the active material provide unexpected proprieties and rebut any prima facie case of obviousness.*

Art Unit: 1745

In the instant specification, Appellants provide an evaluation on the physical properties of 5 different powders. It is alleged that the powder of comparative example 1 is produced when the stirring rate and temperature of the solution are not controlled. See pages 27-29. Table 1 below summarizes various physical properties associated with each powder.

Table 1

	Battery Capacity (C <sub>0.4A</sub> ) (mAh)	Mean Particle Circularity	Percent of Particles with Circularity ≤ 0.85	Surface Area (m <sup>2</sup> /g)	I <sub>001</sub> /I <sub>101</sub>
Ex. 1	2105	0.95	10	12	1.4
Ex. 2	2153	0.96	5	12	1.4
Ex. 3	2189	0.97	2.5	11	1.4
Ex. 4	2205	0.96	2.6	8	1.4
Comp. Ex. 1	2058	0.94	10	14	1.4

It can be concluded from the table that powders of examples 2, 3 and 4 meet the recitation on mean particle circularity, i.e., from greater than 0.95 to less than 1. Powder of examples 2, 3 and 4 meet the recitation such that the circularity of not larger than 0.85 accounts for not more than 5% of the number of total particles. Powders of examples 1 through 5 all meet the recitation that requires a specific surface area not smaller than 5 m<sup>2</sup>/g to not larger than 20 m<sup>2</sup>/g. Powders of examples 1 through 5 all meet the recitation that requires ratio of peak intensity of (001) plane to peak intensity of (101) plane not less than 1.1. In particular, the difference in circularity among the five powders would be statistically indistinguishable if one might consider including standard deviation in the measurement. The difference in battery capacity between powders of example 1 and example 2 is merely 2.2%, which is far from a significant improvement. Moreover, the resultant battery of example 1 exhibits similar capacity

percentage value ( $C_{10A}/C_{0.4A}$ ) and capacity maintenance rate ( $C_{500}/C_{ini}$ ) in comparison with batteries of examples 2, 3 and 4, despite the fact that 10% of the powder in example 1 has a circularity of not larger than 0.85. See Table 1 in page 38 of instant specification. The court held that the evidence relied upon should establish “that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance.” *Ex parte Gelles*, 22 USPQ2d 1318, 1319 (Bd. Pat. App. & Inter. 1992). It is the position of the examiner that Appellants have yet to establish results that are unexpected and significant. In addition, both Hayashi and Kato references cited in the Office Action are pursuant to 35 U.S.C. 102(e)/103(a), thus the arguments based on unexpected and superior results alone cannot overcome anticipation of the claims.

3. *The examiner has ignored the differences between the chemistry and manufacturing procedures of Kato and the present invention. The active material of Kato would not inherently exhibit the claimed properties.*

Appellants argue that Kato reference only discloses the significance of pH and temperature of the solution on the production of cobalt hydroxide powders in Example 2. However, it is noted that Kato also discloses the production of nickel hydroxide powders in Example 1, wherein an aqueous solution containing nickel sulfate as a main component is prepared. To this aqueous solution, an aqueous sodium hydroxide solution is slowly added dropwise while adjusting the pH of the solution with aqueous ammonia, thereby depositing spherical solid solution nickel hydroxide particles, i.e., the circularity of the particle is equal to 1.

The solid solution nickel hydroxide particle has an average particle diameter of 10  $\mu\text{m}$ . See Column 11, Lines 50-65.

Kato further disclose other positive electrode material can be prepared by coating the surface of nickel hydroxide particles with the higher cobalt oxide in Example 2. The above nickel hydroxide particles are charged in an aqueous cobalt sulfate solution. A sodium hydroxide solution is slowly added dropwise, followed by continuous stirring while adjusting the pH of the aqueous solution to be 12 at 35°C, thereby to obtain  $\text{Co}(\text{OH})_2$ -coated nickel hydroxide particles. See Column 21, Lines 24-35. The resulting particles have an average particle diameter of about 10  $\mu\text{m}$  and a BET specific surface area of 7  $\text{m}^2/\text{g}$ . See Column 21, Lines 37-45. Sato is silent about the X-ray diffraction data of the resultant powders. However, it is the position of the examiner that such properties of said material are inherent, given that the positive electrode active material disclosed by Sato et al. and the present application having same chemistry and synthesis procedures. It is noted that the recitation "a positive electrode active material comprising at least one selected from the group consisting of a nickel hydroxide powder and a nickel oxyhydroxide powder" in claim 1 and 8 is an open language, which does not exclude the presence of cobalt hydroxide coating on the nickel hydroxide particles. Since the Sato patent teach, explicitly or inherently, each and every element of the combination recited in independent claims 1 and 8, the rejection of claims 1-4,6-8 under 35 U.S.C. § 102 should be sustained.

4. *There would have been no motivation based on Kato to adjust the reaction conditions to arrive at the claimed material.*

Art Unit: 1745

As admitted by the Appellants, Kato references have identified pH and temperature of the solution as critical processing variables in the fabrication of positive electrode active material. See Column 2, Lines 25-27. Specifically, the reference teaches a method for producing a positive electrode material comprising adding dropwise an aqueous alkaline solution with microwave heating means and mixing/stirring means to form the particles. The inner wall portion of the container is provided with heating means and the inner wall of the container is heated supplementally with the heating means. See Column 4, Lines 43-65. Sato reference has clearly demonstrated the control and monitoring of several processing variables, such as pH and temperature of the solution. Also, it is well known in the art that mixing and stirring enhance the uniformity of the multiple components in the mixture. Therefore, it would have been within the skill of the ordinary artisan to adjust the degree of mixing, pH value and temperature of the solution in order to yield nickel hydroxide or nickel oxyhydroxide powders of desired circularity and distribution of circularity. Discovery of optimum value of result effective variable in known process is ordinarily within skill of art. *In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215. As the Sate patent meet a *prima facie* case of obviousness with respect to claims 1-4,6-8, the rejection of these claims under 35 U.S.C. § 103 should be sustained.


**(11) Related Proceedings Appendix**

None.

Art Unit: 1745

For the above reasons, it is believed that all the rejections should be sustained.

Respectfully Submitted,

  
Dah-Wei D. Yuan  
Primary Examiner, Art Unit 1745

Patrick J. Ryan  
SPE, Art Unit 1745



Steven P. Griffin  
SPE, Art Unit 1731

